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DFO Atlantic Fisheries
Research Document 96/84

MPO Pêches de l'Atlantique
Document de recherche 96/84

STATUS OF ATLANTIC SALMON IN SALMON FISHING AREA 15, NEW BRUNSWICK, 1995

by

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Research documents are produced in the official language in which they are provided to the secretariat.

[1]La présente série documente les bases scientifiques des évaluations des ressources halieutiques sur la côte Atlantique du Canada. Elle traite des problèmes courants selon les échéanciers dictés. Les documents qu'elle contient ne doivent pas être considérés comme des énoncés définitifs sur les sujets traités, mais plutôt comme des rapports d'étape sur les études en cours.

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Abstract

This document summarizes data on spawning escapement targets, harvests, surveys of abundance, and hatchery stocking of Atlantic salmon in rivers of Salmon Fishing Area (SFA) 15, northeastern New Brunswick. Major rivers in this SFA include the Restigouche and Nepisiguit. Angling and First Nations catches in the Québec portion of the Restigouche watershed, which is not part of SFA 15, are not included in this document.

Angling catch statistics for bright salmon were available only for the Restigouche system, Nepisiguit and Jacquet rivers. Retained landings of small bright salmon on these systems were 59% lower than the 1990-1994 mean. First Nations landings of 246 large and 152 small salmon represent a decrease of 36% for large salmon and an increase of 49% for small salmon, compared to the 5-year means.

Spawning targets were not met in the Nepisiguit and Restigouche rivers and were probably not met in the Big Tracadie. The Jacquet River exceeded its spawning target by 53%.

Résumé

Le présent document résume les données sur les niveaux cibles d'échappée des géniteurs, les taux de capture, les relevés d'abondance et l'ensemencement des rivières de la zone de pêche du saumon (ZPS) 15, au nord-est du Nouveau-Brunswick, avec des saumons de l'Atlantique élevés en écloserie. Cette ZPS comprend d'importantes rivières, notamment les rivières Ristigouche et Nepisiguit. Nous n'avons pas inclus les prises des pêcheurs à la ligne, ni celles des premières nations de la partie du bassin versant de la Ristigouche située sur le territoire québécois, laquelle ne fait pas partie de la ZPS 15.

Les statistiques sur les prises à la ligne de saumons de montée sont fournies uniquement pour les réseaux fluviaux des rivières Ristigouche, Nepisiguit et Jacquet. Dans ces trois rivières, les prises conservées de saumons de montée étaient de 59% inférieures à la moyenne de 1990 à 1994. Les débarquements des premières nations, qui se chiffrent à 246 gros saumons et à 152 petits saumons, représentent une baisse de 36% des gros saumons et une hausse de 49% de petits saumons, par rapport à la moyenne quinquennale.

Les niveaux cibles d'échappée des géniteurs n'ont pas été atteints dans les rivières Nepisiguit et Ristigouche, et ils n'ont probablement pas été atteints non plus dans la Grande Rivière Tracadie. Quant à la rivière Jacquet, l'objectif de reproduction a été dépassé de 53%.

Summary Sheet

Stock: Restigouche River, SFA 15
Target: 71.4 million eggs (12,200 large salmon, 2,600 small salmon)
Rearing area: 29,768,000 m^3, 76% of SFA 15, 30% of Gulf New Brunswick

	1990	1991	1992	1993	1994	1995	MIN[1]	MAX[1]	MEAN[2]
Angling catch (retained+released)									
Large	3735	3137	4355	2055	3979	2792	1016	6707	3452
Small	4324	2522	4751	3268	4840	1589	896	6873	3941
Angling catch (retained)									
Large	893	956	1004	514	963	866	514	6707	866
Small	4324	2522	4751	3268	4840	1589	896	6873	3941
First Nations catch									
Large	1606	1111	1422	1202	1365	1187	129	2950	--
Small	136	19	55	0	76	39	0	178	--
Spawning escapement (angling exploitation method)[3]									
Large (X 1000)	6-11	5-9	7-13	3-6	7-12	4-8	1-2	11-19	6-10
Small (X 1000)	4-10	3-6	5-11	3-8	5-11	2-4	1-2	7-16	4-9
Total returns (angling exploitation method)[3]									
Large (X 1000)	10-16	9-14	12-19	6-9	11-17	8-12	6-9	23-30	--
Small (X 1000)	10-17	6-10	11-18	8-13	11-19	4-6	3-4	16-27	--
% egg target met (angling exploitation method)[3]	53-95	43-78	62-111	28-51	56-101	37-68	9-20	89-159	48-87

[1] MIN MAX for years 1970 to present.
[2] MEAN for years 1990 to 1994.
[3] Range given reflects uncertainty of angling exploitation rate (assumed to be between 0.3 and 0.5), from which spawning escapement, eggs, and total returns are derived.

Landings: Angling catches of large (including catch and release in N.B.) and small salmon in 1995 were 19% and 60% lower than the five-year means, respectively.

Data and assessment: The assessment was based on angling catch with an assumed exploitation rate of 0.3-0.5. Visual surveys of spawners provide a minimum estimate of escapement similar to the angling-based estimate with exploitation rate of 0.3. For management purposes the angling-based estimate at exploitation rate=0.3 is recommended; according to this estimate, 68% of target egg spawners (large salmon) was met.

State of the stock: Egg deposition based on large salmon spawning escapement was 68% of target. Small salmon escapement exceeded target levels, but was was low compared to recent years.

Forecast for 1995: Based on mean returns from 1991-1995, between 9,000-14,000 large salmon and 8,000-13,000 small salmon are expected to return in 1996.

Summary Sheet

STOCK: Nepisiguit River, SFA 15
TARGET: 9.6 million eggs (1363 large salmon, 690 small salmon)
REARING AREA: 3,973,000 m², 30% of SFA 15, 4% of Gulf New Brunswick

	1990	1991	1992	1993	1994	1995	MIN	MAX	MEAN
Angling									
Large (Released)	300	300	270	258	250	300	60	600	276
Small (Retained)	500	700	800	470	380	350	229	1000	570
First Nation Harvest									
Large	n/a	n/a	n/a	50	0	44			
Small	n/a	n/a	n/a	200	120	131			
Spawning escapement									
Large	1117	1026	336	925	773	819	109	2381	835
Small	1593	2164	1092	836	501	425	309	2900	1237
Total returns									
Large	1390	1290	642	1084	892	1037	545	2700	1267
Small	2152	2930	1974	1511	1018	918	562	2930	1917
% egg target met	89	85	29	72	59	62	9	187	67

MIN and MAX: 1982-1995, MEAN: 1990-1994

Landings: Small salmon angling harvest was the lowest since 1985. Large salmon catch was average. Native harvest in 1995 was estimated as 131 small and 44 large salmon.

Data and assessment: Salmon spawning escapement was estimated from returns to a counting fence in conjunction with harvest statistics. For the years 1990, 1991, 1993-1995, counting fence returns were estimated using the historic relationship between fence counts and angling catch above the fence. This estimate may be conservative in 1995 because of low water conditions; a higher proportion of fish than usual remained in the estuary or lower river until after the end of the angling season. Spawning escapement below the fence was estimated using the ratio of spawning redds above and below the fence. Total returns below the fence were then calculated as the sum of spawning escapement plus removals.

State of the stock: The estimated spawning escapement of large salmon was 819, well below requirements for the system. Small salmon spawning escapement of 425 was also below requirements. Returns of large salmon were 18% below average, and returns of small salmon were 52% below average.

Summary Sheet

STOCK: Jacquet River, SFA 15
TARGET: 2,724,000 eggs (320 large salmon, 180 small salmon)
REARING AREA: 1,135,000 m^2

	1990	1991	1992	1993	1994	1995	MIN[1]	MAX[1]	MEAN[2]
Angling (bright salmon)									
Large (Released)	58	23	95	--	100	0	0	105	69
Small (Retained)	82	56	105	--	33	61	33	110	69
Spawning escapement									
Large	--	--	--	--	493	489	--	--	--
Small	--	--	--	--	486	243	--	--	--
Total returns									
Large	--	--	--	--	595	584	--	--	--
Small	--	--	--	--	613	359	--	--	--
% egg target met (large salmon only)	--	--	--	--	154	153	--	--	--

1 MIN and MAX of years 1984-1995
2 MEAN of years 1990-1994

Landings: Small and large salmon angling catches were lower than average.

Data and assessment: Salmon spawning escapement has been estimated from returns to a counting fence in conjunction with harvest statistics. Poaching mortalities are conservatively estimated at 16% for large and 14% for small salmon (based on the Restigouche assessment).

State of the stock: The estimated spawning escapement of large salmon was 489 in 1995, well above requirements for the system. Small salmon spawning escapement of 243 was also above requirements. The estimated egg deposition was 53% above target.

1 - Introduction

This document summarizes 1995 research data, harvest statistics, and hatchery stocking of Atlantic salmon in rivers of Salmon Fishing Area (SFA) 15 (Fig. 1). Rivers for which research data were collected in 1995 are the Bass, Big Tracadie, Jacquet, Middle, Millstream, Nepisiguit, Nigadoo, Restigouche system (Kedgwick, Upsalquitch, Patapedia, Restigouche) and Tetagouche. Stocking took place in the Nepisiguit, Restigouche and Tetagouche rivers. Catch statistics were available in 1995 for only the Restigouche system, Nepisiguit and Jacquet rivers (both bright and kelt seasons), and the Middle, Nigadoo and Tetagouche rivers (kelt season only). Unreported catch was not estimated in 1995.

For consistency with previous reports on SFA 15, harvest data for the Nepisiguit River and the New Brunswick portion of the Restigouche watershed are included; however, research documents on stock status of salmon in the Restigouche (Locke et al. 1996) and Nepisiguit (Locke and Mowbray 1996) rivers should be consulted for specific stock assessment information, including data on the portion of the Restigouche watershed outside SFA 15.

In this report, salmon are subdivided into two size classes. Small salmon are adults less than 63 cm in fork length (1SW, one sea-winter salmon or grilse). Large salmon are adults greater than or equal to 63 cm in fork length (MSW or multi-sea-winter salmon).

2 - Description of fisheries

Fisheries in SFA 15 are primarily angling fisheries.

First Nations on the Restigouche (Eel River Bar and Madawaska Maliseet First Nations) and Nepisiguit (Pabineau First Nation) rivers have harvested salmon using gillnets and/or angling in recent years. Eel River Bar First Nation harvests were taken in Crown Open waters of the Restigouche system and in Chaleur Bay waters, but their fishing agreement with DFO included the Benjamin, Charlo, Jacquet and Eel rivers. Madawaska Maliseet First Nation's fishing agreement with DFO included waters of the Restigouche watershed (Crown Open waters of the Main Restigouche, Kedgwick and Gounamitz rivers). Listuguj First Nation also fishes salmon in the Restigouche River, but due to its location on the Québec shore of the river the estimated catch of this First Nation is not included in harvest statistics for SFA 15.

As in other New Brunswick watersheds, there was no commercial fishery in SFA 15 in 1995.

Angling regulations and seasons were similar to those in 1994. As in other New Brunswick waters, anglers were required to release all large salmon back into the river. Catches of small

salmon were restricted by season and daily bag limits to eight and two fish, respectively.

3 - Fishery Data

3.1 - Angling catch

In 1995, angling catches of both bright salmon and kelts were recorded for the Restigouche system, Nepisiguit and Jacquet rivers, whereas in the Middle, Tetagouche and Nigadoo rivers only angling catches of kelts were available (data sources as in Locke et al. 1995). Angling catches of bright salmon in the Middle and Tetagouche rivers and kelt and bright salmon in the Big Tracadie River, which had been included in SFA 15 totals in previous years, were not recorded. In 1994, these three rivers accounted for a substantial proportion of recorded kelt catches (63% of small and 42% of large salmon) but only a small proportion of bright salmon catches (5% of small and 2% of large salmon).

As in previous years, catches reported for the Kedgwick and Patapedia rivers included only New Brunswick catch data. The Kedgwick, Patapedia, Upsalquitch and Restigouche catches were summed as the Restigouche system.

Total retained landings of small salmon by anglers in SFA 15 were 1697 (1646 bright, 51 kelts; Table 1). These figures do not include catches of small salmon that were hooked-and-released. Retained landings of small bright salmon decreased by 59%, and small kelt salmon decreased by 46%, relative to the 1990-1994 means.

Angled small bright salmon landings decreased relative to the 5-year mean in all tributaries of the Restigouche, and in the Jacquet and Nepisiguit rivers (Table 2).

Reported catches of large salmon were 2256 (2226 bright, 30 kelt; Table 1). It should be noted, however, that hooked-and-released catches of large salmon were not consistently reported, and that salmon may be caught more than once by this method.

Angled bright large salmon catches increased in the Patapedia and Nepisiguit rivers but decreased in the Restigouche, Kedgwick, Jacquet and Upsalquitch rivers (Table 2).

3.2 - First Nations catch

First Nations catches were reported to DFO by band fisheries coordinators. Landed weight of these catches was estimated by assuming individual weights of 1.5 kg and 6.4 kg for small and large salmon respectively, based on the mean weights of salmon collected in a research trap formerly located at Dalhousie

on Chaleur Bay.

First Nations harvests were 36% lower than the 1990-1994 mean for large salmon, but 49% higher for small salmon (Table 3). Harvests totalled 246 large and 152 small salmon.

3.3 - Unreported removals

Unreported removals were not estimated in 1995 since the marine component of this estimate, obtained from Conservation and Protection personnel in previous years, was not available.

4 - River-specific data and status of stocks

4.1 - General comments

Collection of the data presented in this report has been carried out by a number of government and non-government organizations. Not all types of data are available for all rivers. The organization (other than DFO) providing the data is identified.

Spawning targets used in this document were obtained from Anon. (1978). Targets were set assuming that all eggs come from large salmon and using a target egg deposition of 2.4 eggs·m^{-2}. Where surveys of rearing area were not available, rearing areas were estimated from the drainage area of the river, and the proportion of rearing area to drainage area for surveyed rivers in the same geographic area. Biological characteristics of the salmon stocks were sampled in the Restigouche and Nepisiguit rivers. Biological characteristics of other stocks were based on samples from the Restigouche River, except for Big Tracadie and Pokemouche rivers, which were based on Miramichi River stocks (Anon., 1978).

For electrofishing studies of juvenile abundances, there were some differences between methodologies used by DFO and other organizations. All the juvenile abundances mentioned in this document were obtained at sites enclosed by barrier nets. Juvenile abundances were estimated by removal using either the Zippin (1956) method (DFO) or the DeLury (1958) method (Nepisiguit Salmon Association, NSA). Length-frequency distributions were used to establish juvenile age classes for the Restigouche sites sampled by DFO. For the rivers sampled by NSA, juvenile age categories were established using fixed size cutoffs (age 0 parr, ≤5.5 cm; age 1 parr, 5.6-10.5 cm; age 2 parr, ≥10.6 cm).

4.2 - Bass River

Spawning target: None.

Angling season: Kelts, Apr. 15-May 15

Bright salmon, June 1-Oct. 31

Angling catch: Unknown.

Juvenile stocking and broodstock collection: None.

Spawner surveys: None.

Redd surveys: None.

Counting fence data: None.

Juvenile surveys (NSA): For the first year, electrofishing surveys of juvenile abundance were carried out at three sites on this river. Mean abundance of age 1 parr was relatively high, at 25.3 parr·100 m^{-2}, although only 10.1 age 0 parr·100 m^{-2} were observed (Table 4).

Status of stocks: Spawner and redd counts conducted by DNRE indicated that few salmon spawned in 1994 (only 5 spawners and 17 redds were observed; Locke et al. 1995). In 1995, age 0 parr density (from eggs deposited in 1994) was less than half of age 1 parr density (from eggs deposited in 1993); perhaps the 1994 spawning escapement was unusually low or egg survival to age 0 parr was poor.

4.3 - Big Tracadie River

Spawning target: 1,442,000 eggs; 140 large and 140 small salmon.

Angling season: Kelts, Apr. 15-May 15
Bright salmon, June 1-Oct. 31 (above Lord and Foy Brook, June 1-Oct. 15)

Angling catch: Unknown.

Juvenile stocking and broodstock collection: None.

Spawner surveys (DNRE): Big Tracadie River was surveyed for the second time in 1995. A maximum value of 83 salmon (49 large, 34 small) was observed. This 1995 value represents a reduction of 2% compared to the 1994 value for the same area (Lord and Foy Brook to head of tide) (Table 5a). In 1994 many salmon were observed in tidal pools, which were empty in 1995.

Redd surveys: Redds were counted in the Big Tracadie River for the second time in 1995. In the survey, conducted on Nov. 7, 186 redds were counted in the stretch from Lord and Foy Brook to head of tide. This represents a reduction of 6% from the 1994 survey of the same stretch (Table 5b).

Counting fence data: None.

Juvenile surveys: None.

Status of stocks: Salmon angling catches in this river have consistently increased over the past decade (Locke et al. 1995) although catches for 1995 are unknown. Spawner counts of 49 large and 34 small salmon are below target.

4.4 - Jacquet River

Spawning target: 2,724,000 eggs; 320 large and 180 small salmon.

Angling season: Kelts, Apr. 15-May 15
Bright salmon, June 1-Oct. 31 (above Halfway Pool, June 1-Oct. 15)

Angling catch: Kelts, 18 small and 30 large salmon
Bright salmon, 61 small and 0 large salmon (Table 2)

Juvenile stocking and broodstock collection: None.

Spawner surveys: None.

Redd surveys (DNRE): In 1995, 477 redds were counted in a stretch where 420 were observed in 1994 (Table 6).

Counting fence data (DNRE): In 1995, a barrier fence was operated for the second year at Big Rock Pool just upriver of the Highway 11 bridge. The fence operated from June 18 to October 31. In total, 584 large and 359 small salmon returned to the fence. Mortalities of 5 small and 2 large salmon were recorded at the fence. The number of fish released from the fence was 582 large salmon and 354 small salmon.

As in 1994, the majority of fish (97% of large and 73% of small salmon) reached the fence after October 1, although 22% of small salmon had arrived by the end of August (Fig. 2).

Juvenile surveys: None.

Status of stocks: Subtracting the reported 1995 angling mortalities, all or most of which occurred above the fence (0 large salmon, plus a retained catch of 61 small salmon) from the barrier fence releases (582 large salmon, 354 small salmon), the maximum possible spawning escapement would be 582 large salmon and 293 small salmon. If poaching and disease account for 16% of the 582 large and 14% of the 354 small salmon released from the barrier fence (based on poaching and disease estimates used in the Restigouche assessment (Locke et al. 1996)), 489 large and 243 small salmon would remain. If these figures are correct, target spawning escapement (320 large salmon, 180 small salmon) was exceeded in 1995. The extent of poaching in the Jacquet River was not quantified but is believed to be an important source of

mortality. Poaching in 1994 and 1995 was probably less than in recent years since large salmon were held at the barrier pool until late October. Poaching of large salmon would have to remove 45% of the 582 large salmon passing the fence in order for spawning escapement to be below the target level.

Research Recommendation: Estimates of target egg deposition in the Jacquet River should be re-evaluated using biological data collected from fish at the barrier fence, and habitat estimates may also require revision.

4.5 - Little River

Spawning target: None.

Angling season: Kelts, Apr. 15-May 15
Bright salmon, June 1-Oct. 31

Angling catch: Unknown.

Juvenile stocking and broodstock collection: None.

Spawner surveys: None.

Redd surveys: None.

Counting fence data: None.

Juvenile surveys: None.

Status of stocks: Unknown. Status is presumed poor to nonexistent, although a local citizen has noted some migration over the last five years. In late October 1995, a salmon kill of at least 36 fish was reported in the lower reaches of the Little River. Salmon entering the river at high tide were being trapped in pools at low tide, and mortality occurred when tidal waters receded and were replaced with acidic fresh water outflow of industrial origin. On October 28, NSA installed a barrier net across the river to prevent fish from entering at high tide. The origin of the salmon is unknown but most likely these were fish which would normally enter Middle River, but were prevented from doing so by extremely low water levels.

4.6 - Middle River

Spawning target: 2,280,000 eggs; 270 large and 150 small salmon.

Angling season: Kelts, Apr. 15-May 15
Bright salmon, June 1-Oct. 31

Angling catch: Kelts, 15 small and unknown large.

Bright salmon, unknown.

Juvenile stocking and broodstock collection: None.

Spawner surveys: None.

Redd surveys: None.

Counting fence data: None.

Juvenile surveys (NSA): Four to six sites have been electrofished annually since 1983 (Table 7). Mean abundance of age 0 parr in 1994 was the second-highest ever recorded, and abundance of age 1 parr in 1995 was the highest ever recorded. Although abundance of age 1 parr in 1994 was the lowest in five years, abundance of age 2 parr in 1995 was the second-highest ever recorded.

Status of stocks: There is insufficient data on the abundance of adult salmon to determine if the target spawning escapement is being met. Electrofishing data suggest that juveniles are relatively abundant.

4.7 - Millstream River

Spawning target: None.

Angling season: Kelts, Apr. 15-May 15
Bright salmon, June 1-Oct. 31

Angling catch: Unknown.

Juvenile stocking and broodstock collection: None.

Spawner surveys: None.

Redd surveys: None.

Counting fence data: None.

Juvenile surveys (NSA): Three sites were electrofished for the first time in 1995 (Table 8). High juvenile abundances were found at one site below the waterfall located by the Old Dunlop Mill (above the #11 highway crossing). No juveniles were present at two sites above the falls.

Status of stocks: Unknown. Electrofishing data suggest that juveniles are abundant in areas accessible to natural spawning, but this is based on a sample size of one.

4.8 - Nepisiguit River

Data: See Locke and Mowbray (1996) for a detailed assessment of the Nepisiguit River salmon stock.

Status of stocks: Only 62% of the spawning target was achieved in 1995.

4.9 - Nigadoo River

Spawning target: None.

Angling season: Kelts, Apr. 15-May 15
Bright salmon, June 1-Oct. 31

Angling catch: Kelts, 9 small and unknown large
Bright salmon, unknown (Table 2)

Juvenile stocking and broodstock collection: None.

Spawner surveys: None.

Redd surveys: None.

Counting fence data: None.

Juvenile surveys (NSA): Electrofishing data were collected for the second time in 1995 (Table 9), and abundances were similar to those at the single site electrofished in 1994.

Status of stocks: Unknown.

4.10 - Restigouche River

Data: See Locke et al. (1996) for a detailed assessment of the Restigouche River salmon population.

Status of stocks: Egg deposition is believed to be at approximately 68% of target levels in 1995.

4.11 - Tetagouche River

Spawning target: 718,000 eggs; 80 large and 50 small salmon.

Angling season: Kelts, Apr. 15-May 15
Bright salmon, June 1-Oct. 31

Angling catch: Kelts, 9 small and unknown large
Bright salmon, not recorded

Juvenile stocking and broodstock collection: Fall fingerlings (6,000) of Nepisiguit River origin, reared in NSA incubation boxes, were distributed to the Tetagouche River in 1995 (Table 10). The area to which these fry were distributed, above the falls, is not accessible to natural spawning of wild stocks and is not included in the calculation of the spawning target.

Spawner surveys: None.

Redd surveys: None.

Counting fence data: None.

Juvenile surveys (NSA): Parr densities in the Tetagouche River were similar to those of 1989-1994, which were an order of magnitude higher than those of 1984-1988 (Table 11).

Status of stock: Unknown. Juvenile abundances have been relatively high for the past seven years. Stocking of juveniles is probably not required for this river to meet its spawning target.

5 - Research Recommendations

1. **Priorities should be set as to which rivers of SFA 15 contain important salmon stocks to be monitored. (In addition to the Restigouche and Nepisiguit, the Jacquet and Big Tracadie are likely candidates for continued monitoring.)**

- Insufficient data are available to determine if spawning escapement has been met on most of the rivers in SFA 15.
- There are no spawning targets for many rivers.
- Collection of research data on rivers other than the Nepisiguit and Restigouche has been, and will continue to be, dependent upon provincial agencies and private clubs.
- Collection of angling statistics in SFA 15 by DFO Conservation and Protection officers has been curtailed in 1995 and this will most likely continue to be the case in the near future.

2. **Re-evaluate the target egg deposition in the Jacquet River.** This target should be re-evaluated using biological data collected from fish at the barrier fence. Habitat estimates may also require revision.

6- Acknowledgements

We thank Robert Baker, Paul Cameron, Ernest Ferguson and the many Conservation and Protection officers who have provided data and advice in the preparation of this document. Comments by Fred Whoriskey, Rod Bradford, Jim Conlan and Peter Hardie on earlier versions of the manuscript are also appreciated.

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Table 1. Annual angling catch, SFA 15. Large salmon hook-and-release catch was not consistently reported; mean was not calculated if only part of the large salmon catch was reported.

Year	Bright salmon			Kelts		
	Small	Large	Total	Small	Large	Total
1984	2113	1822	3935	0	3	3
1985	3639	3629	7268	66	11	77
1986	5961	5390	11351	64	16	80
1987	5386	3746	9132	66	61	127
1988	7278	5238	12516	62	57	119
1989	3652	3993	7645	50	37	87
1990	4277	3222	7499	61	49	110
1991	2894	2541	5435	61	70	131
1992	5157	3752	8909	162	59	221
1993	3111	1843	4954	54	32	86
1994	4611	3468	8079	130	69	199
1995[a]	1646	2226	3872	51	30	81
Mean (90-94)	4010	--	--	94	--	--
1995 cf. Mean	--	--	--	-46	--	--

[a] Bright catch not recorded for Middle, Nigadoo and Tetagouche rivers.

Table 2. Annual summaries of catch (including retained and hooked-and-released salmon) and effort (rod-days) for Salmon Fishing Area 15. Large salmon hook-and-release catch was not consistently reported; catch-per-unit-effort (CPUE), % large salmon and mean were not calculated if only part of the large salmon catch was reported.

River and Year	Kelts						Bright salmon					
	Small	Large	Total	Effort	CPUE	%Large	Small	Large	Total	Effort	CPUE	%Large
Jacquet												
1984	0	3	3	50	0.06	100	39	-	39	275	0.14	-
1985	6	-	6	25	0.24	-	34	52	86	270	0.32	60
1986	10	6	16	50	0.32	38	76	105	181	355	0.51	58
1987	15	50	65	120	0.54	77	45	27	72	165	0.44	38
1988	16	42	58	180	0.32	72	110	70	180	320	0.56	39
1989	13	25	38	165	0.23	66	70	42	112	330	0.34	38
1990	20	32	52	75	0.69	62	82	58	140	330	0.42	41
1991	15	35	50	150	0.33	70	56	23	79	295	0.27	29
1992	20	15	35	90	0.39	43	105	95	200	455	0.44	48
1993	-	-	-	-	-	-	-	-	-	-	-	-
1994	20	10	30	90	0.33	33	33	100	133	720	0.18	75
1995	18	30	48	130	0.37	63	61	0	61	740	0.08	0
Mean (90-94)	19	23	42	101	0.44	52	69	69	138	450	0.33	48
1995 cf. Mean	-5%	+30%	+14%	+29%	-16%	+21%	-12%	-100%	-56%	+64%	-76%	-100%
Kedgwick												
1984	-	-	-	-	-	-	145	154	299	1126	0.27	52
1985	-	-	-	-	-	-	326	172	498	1441	0.35	35
1986	-	-	-	-	-	-	561	476	1037	1103	0.94	46
1987	-	-	-	-	-	-	575	394	969	1147	0.84	41
1988	-	-	-	-	-	-	803	676	1479	1203	1.23	46
1989	-	-	-	-	-	-	207	528	735	1266	0.58	72
1990	-	-	-	-	-	-	300	244	544	1148	0.47	45
1991	-	-	-	-	-	-	277	400	677	970	0.70	59
1992	-	-	-	-	-	-	417	303	720	1195	0.60	42
1993	-	-	-	-	-	-	231	102	333	567	0.59	31
1994	-	-	-	-	-	-	453	205	658	1192	0.55	31
1995	-	-	-	-	-	-	119	202	321	1226	0.26	63
Mean (90-94)	-	-	-	-	-	-	336	251	586	1014	0.58	42
1995 cf. Mean	-	-	-	-	-	-	-65%	-20%	-45%	+21%	-55%	+50%

Table 2. Continued.

River and Year	Kelts						Bright salmon					
	Small	Large	Total	Effort	CPUE	%Large	Small	Large	Total	Effort	CPUE	%Large
Middle												
1984	-	-	-	-	-	-	-	-	-	-	-	-
1985	30	-	30	105	0.29	-	52	-	52	425	0.12	-
1986	33	-	33	117	0.28	-	81	-	81	564	0.14	-
1987	30	-	30	115	0.26	-	50	-	50	295	0.17	-
1988	25	-	25	80	0.31	-	32	-	32	169	0.19	-
1989	25	-	25	80	0.31	-	53	-	53	287	0.18	-
1990	15	-	15	90	0.17	-	50	-	50	244	0.20	-
1991	26	-	26	45	0.58	-	66	-	66	271	0.24	-
1992	100	-	100	210	0.48	-	104	-	104	240	0.43	-
1993	20	-	20	92	0.22	-	64	-	64	213	0.30	-
1994	30	-	30	180	0.17	-	90	-	90	280	0.32	-
1995	15	-	15	80	0.19	-	-	-	-	-	-	-
Mean (90-94)	38	-	38	123	0.32	-	75	-	75	250	0.30	-
1995 cf. Mean	-61%	-	-61%	-35%	-41%	-	-	-	-	-	-	-
Nepisiguit												
1984	-	-	-	-	-	-	600	150	750	3015	0.25	20
1985	-	-	-	-	-	-	229	-	229	1734	0.13	-
1986	-	-	-	-	-	-	800	500	1300	3600	0.36	38
1987	-	-	-	-	-	-	800	500	1300	4250	0.31	38
1988	-	-	-	-	-	-	1000	600	1600	5000	0.32	38
1989	-	-	-	-	-	-	600	490	1090	4000	0.27	45
1990	-	-	-	-	-	-	500	300	800	3400	0.24	38
1991	-	-	-	-	-	-	700	300	1000	3700	0.27	30
1992	-	-	-	-	-	-	800	270	1070	4700	0.23	25
1993	-	-	-	-	-	-	470	258	728	3300	0.22	35
1994	-	-	-	-	-	-	370	250	620	3700	0.17	40
1995	-	-	-	-	-	-	350	300	650	2900	0.22	46
Mean (90-94)	-	-	-	-	-	-	568	276	844	3760	0.23	34
1995 cf. Mean	-	-	-	-	-	-	-38%	+9%	-23%	-23%	-4%	+35%

Table 2. Continued.

River and Year	Kelts						Bright salmon					
	Small	Large	Total	Effort	CPUE	%Large	Small	Large	Total	Effort	CPUE	%Large
Nigadoo												
1984	-	-	-	-	-	-	-	-	-	-	-	-
1985	-	-	-	-	-	-	-	-	-	-	-	-
1986	-	-	-	-	-	-	-	-	-	-	-	-
1987	-	-	-	-	-	-	-	-	-	-	-	-
1988	-	-	-	-	-	-	-	-	-	-	-	-
1989	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-
1994	18	-	18	70	0.26	-	30	-	30	170	0.18	-
1995	9	-	9	40	0.23	-	-	-	-	-	-	-
Mean (90-94)	18	-	18	70	0.26	-	30	-	30	170	0.18	-
1995 cf. Mean	-50%	-	-50%	-43%	-12%	-	-	-	-	-	-	-
Patapedia												
1984	-	-	-	-	-	-	19	25	44	156	0.28	57
1985	-	-	-	-	-	-	55	53	108	132	0.82	49
1986	-	-	-	-	-	-	55	99	154	169	0.91	64
1987	-	-	-	-	-	-	107	37	144	162	0.89	26
1988	-	-	-	-	-	-	80	77	157	195	0.81	49
1989	-	-	-	-	-	-	31	35	66	211	0.31	53
1990	-	-	-	-	-	-	38	22	60	237	0.25	37
1991	-	-	-	-	-	-	16	16	32	136	0.24	50
1992	-	-	-	-	-	-	66	36	102	206	0.50	35
1993	-	-	-	-	-	-	19	9	28	220	0.13	32
1994	-	-	-	-	-	-	73	31	104	126	0.83	30
1995	-	-	-	-	-	-	15	34	49	170	0.29	69
Mean (90-94)	-	-	-	-	-	-	42	23	65	185	0.39	37
1995 cf. Mean	-	-	-	-	-	-	-64%	+48%	-25%	-8%	-26%	+86%

Table 2. Continued.

River and Year	Kelts						Bright salmon					
	Small	Large	Total	Effort	CPUE	%Large	Small	Large	Total	Effort	CPUE	%Large
Restigouche												
1984	-	-	-	-	-	-	827	1147	1974	4551	0.43	58
1985	-	-	-	-	-	-	1702	2831	4533	7236	0.63	62
1986	-	-	-	-	-	-	2902	3558	6460	7070	0.91	55
1987	-	-	-	-	-	-	2913	2362	5275	6887	0.77	45
1988	-	-	-	-	-	-	3905	3134	7039	7577	0.93	45
1989	-	-	-	-	-	-	1777	2363	4140	6104	0.68	57
1990	-	-	-	-	-	-	2316	2201	4517	7466	0.61	49
1991	-	-	-	-	-	-	1291	1570	2861	6511	0.44	55
1992	-	-	-	-	-	-	2336	2451	4787	6706	0.71	51
1993	-	-	-	-	-	-	1578	1209	2787	7359	0.38	43
1994	-	-	-	-	-	-	2204	2272	4476	7152	0.63	51
1995	-	-	-	-	-	-	794	1386	2180	6476	0.34	64
Mean (90-94)	-	-	-	-	-	-	1945	1941	3886	7039	0.55	50
1995 cf. Mean	-	-	-	-	-	-	-59%	-29%	-44%	-8%	-38%	+28%
Tetagouche												
1984	-	-	-	-	-	-	-	-	-	-	-	-
1985	18	-	18	75	0.24	-	55	-	55	431	0.13	-
1986	10	-	10	45	0.22	-	76	-	76	519	0.15	-
1987	15	-	15	70	0.21	-	65	-	65	315	0.21	-
1988	15	-	15	60	0.25	-	28	-	28	138	0.20	-
1989	10	-	10	65	0.15	-	54	-	54	290	0.19	-
1990	23	-	23	136	0.17	-	55	-	55	267	0.21	-
1991	16	-	16	40	0.40	-	68	-	68	288	0.24	-
1992	30	-	30	60	0.50	-	112	-	112	260	0.43	-
1993	12	-	12	42	0.29	-	61	-	61	203	0.30	-
1994	20	-	20	105	0.19	-	78	-	78	249	0.31	-
1995	9	-	9	60	0.15	-	-	-	-	-	-	-
Mean (90-94)	20	-	20	77	0.31	-	75	-	75	253	0.30	-
1995 cf. Mean	-55%	-	-55%	-22%	-52%	-	-	-	-	-	-	-

Table 2. Continued.

River and Year	Kelts						Bright salmon					
	Small	Large	Total	Effort	CPUE	%Large	Small	Large	Total	Effort	CPUE	%Large
Upsalquitch												
1984	-	-	-	-	-	-	483	346	829	1465	0.57	42
1985	-	-	-	-	-	-	1175	507	1682	1690	1.00	30
1986	-	-	-	-	-	-	1397	630	2027	1756	1.15	31
1987	-	-	-	-	-	-	819	410	1229	1935	0.64	33
1988	-	-	-	-	-	-	1296	659	1955	2101	0.93	34
1989	-	-	-	-	-	-	836	515	1351	1804	0.75	38
1990	-	-	-	-	-	-	905	375	1280	2313	0.55	29
1991	-	-	-	-	-	-	403	195	598	1600	0.37	33
1992	-	-	-	-	-	-	1180	561	1741	1859	0.94	32
1993	-	-	-	-	-	-	644	221	865	2021	0.43	26
1994	-	-	-	-	-	-	1212	508	1720	1833	0.94	30
1995	-	-	-	-	-	-	307	304	611	2076	0.29	50
Mean (90-94)	-	-	-	-	-	-	869	372	1241	1925	0.65	30
1995 cf. Mean	-	-	-	-	-	-	-65%	-18%	-51%	+8%	-55%	+67%
Restigouche River System (Kedgwick, Patapedia, Restigouche, Upsalquitch)												
1984	-	-	-	-	-	-	1474	1672	3146	7298	0.43	53
1985	-	-	-	-	-	-	3258	3563	6821	10499	0.65	52
1986	-	-	-	-	-	-	4915	4763	9678	10098	0.96	49
1987	-	-	-	-	-	-	4414	3203	7617	10131	0.75	42
1988	-	-	-	-	-	-	6084	4546	10630	11076	0.96	43
1989	-	-	-	-	-	-	2851	3441	6292	9385	0.67	55
1990	-	-	-	-	-	-	3559	2842	6401	11164	0.57	44
1991	-	-	-	-	-	-	1987	2181	4168	9217	0.45	52
1992	-	-	-	-	-	-	3999	3351	7350	9966	0.74	46
1993	-	-	-	-	-	-	2472	1541	4013	10167	0.39	38
1994	-	-	-	-	-	-	3942	3016	6958	10303	0.68	43
1995	-	-	-	-	-	-	1235	1926	3161	9948	0.32	61
Mean (90-94)	-	-	-	-	-	-	3192	2586	5778	10163	0.57	45
1995 cf. Mean	-	-	-	-	-	-	-61%	-26%	-45%	-2%	-44%	+36%

Table 2. Continued.

River and Year	Kelts						Bright salmon					
	Small	Large	Total	Effort	CPUE	%Large	Small	Large	Total	Effort	CPUE	%Large
SFA 15 Totals												
1984	0	3	3	50	-	-	2113	1822	3935	10588	-	-
1985	66	11	77	235	-	-	3639	3629	7268	13466	-	-
1986	64	16	80	242	-	-	5961	5390	11351	15243	-	-
1987	66	61	127	350	-	-	5386	3746	9132	15279	-	-
1988	62	57	119	366	-	-	7278	5238	12516	17040	-	-
1989	50	37	87	351	-	-	3652	3993	7645	14512	-	-
1990	61	49	110	363	-	-	4277	3222	7499	15615	-	-
1991	61	70	131	323	-	-	2894	2541	5435	13924	-	-
1992	162	59	221	553	-	-	5157	3752	8909	15961	-	-
1993	54	32	86	315	-	-	3111	1843	4954	14230	-	-
1994	130	69	199	807	-	-	4611	3468	8079	16454	-	-
1995*	51	30	81	310	-	-	1646	2226	3872	13588	-	-
Mean (90-94)	94	-	-	472	-	-	4010	-	-	15237	-	-
1995 cf. Mean	-46%	-	-	-34%	-	-	-	-	-	-	-	-

* Bright catch not recorded for Middle, Nigadoo and Tetagouche rivers.

Table 3. Summary of First Nations harvests of salmon (by size class) in SFA 15.

River	1990	1991	1992	1993	1994	1995	(90-94)	95 cf. mean
Restigouche								
Large	471	252	474	301	380	202	376	-46%
Small	120	10	2	0	58	21	38	-45%
Nepisiguit								
Large	na	na	na	50	0	44	25	+76%
Small	na	na	na	200	120	131	160	-18%
SFA 15 TOTALS								
Large	471	252	474	351	380	246	386	-36%
Small	120	10	2	200	178	152	102	+49%
Wt.(kg)	3194	1628	3037	2546	2699	1802	2621	-31%

Table 4. Electrofishing data, Bass River (from Nepisiguit Salmon Association).

Year	No. of sites	Mean abundance (parr·100 m^{-2})		
		age 0	age 1	age 2
1995	3	10.1	25.3	2.0

Table 5. Atlantic salmon spawner and redd counts conducted by DNRE in the Big Tracadie River.

(a) Spawner counts.

Year	Date	Salmon counts Small	Large	Total	Area surveyed
1994	Oct. 25	1	0	1	Duke's camp to Pokemouche Landing
		5	14	19	Pokemouche Landing to Lord and Foy Brk.
		40	45	85	Lord and Foy Brk. to head of tide
		33	66	99	Tidal pools
	(total)	79	125	204	
1995	Oct. 24	4	3	7	Pokemouche Landing to Lord and Foy Brk.
	Oct. 26	13	42	55	Lord and Foy Brk. to head of tide
	Oct. 26	0	0	0	Tidal pools
	Nov. 7	34	49	83	Lord and Foy Brk. to head of tide
		0	0	0	Tidal pools
	(total)	34	49	83	

(b) Redd counts

Year	Date	Redds	Area surveyed
1994	Nov. 11	83	Pokemouche Landing to Lord and Foy Brk.
	Nov. 14	197	Lord and Foy Brk. to head of tide
		0	Tidal pools
	(total)	280	
1995	Nov. 7	186	Lord and Foy Brk. to head of tide
		0	Tidal pools
	(total)	186	

Table 7. Electrofishing data, Middle River (from Nepisiguit Salmon Association).

Year	No. of sites	Mean abundance (parr·100 m^{-2}) age 0	age 1	age 2
1983	6	38.2	6.4	1.4
1984	5	4.3	6.6	0.3
1985	6	0.6	4.0	1.6
1986	6	0.7	1.6	0.9
1987	5	35.0	3.4	0.2
1988	5	33.0	8.7	0.0
1989	6	25.0	7.6	1.7
1990	6	5.4	22.9	0.0
1991	5	10.6	20.8	0.0
1992	5	81.6	12.4	5.1
1993	4	20.0	17.8	1.4
1994	4	66.4	10.4	2.5
1995	5	31.3	39.6	3.6

Table 8. Electrofishing data, Millstream River (from Nepisiguit Salmon Association).

Year	No. of sites	Mean abundance (parr·100 m^{-2}) age 0	age 1	age 2
1995 (below falls)	1	99.0	80.6	10.6
1995 (above falls)	2	0.0	0.0	0.0

Table 9. Electrofishing data, Nigadoo River (from Nepisiguit Salmon Association).

Year	No. of sites	Mean abundance (parr·100 m^{-2}) age 0	age 1	age 2
1994	1	7.3	6.8	4.4
1995	4	11.7	7.9	4.0

Table 10. Atlantic salmon enhancement projects in SFA 15, 1992-1995. For Nepisiguit and Restigouche Rivers, see Locke and Mowbray 1996, and Locke et al. 1996.

(a) Annual broodstock collections and juvenile distributions.

		Broodstock collection			Juvenile distributions		
River	Year	male	female	#eggs	life stage	number	%marked
Tetagouche	1994	0	0	0	age 0 parr	50,000	0
	1995	0	0	0	age 0 parr	6,000	0

Table 11. Electrofishing data, Tetagouche River (from Nepisiguit Salmon Association).

		Mean abundance (parr·100 m^{-2})		
Year	No. of sites	age 0	age 1	age 2
1983	2	27.1	5.4	1.0
1984	2	2.7	0.0	0.0
1985	2	5.6	0.7	0.0
1986	2	0.9	0.5	0.0
1987	3	6.6	0.6	0.0
1988	3	7.2	1.7	0.0
1989	4	36.2	5.2	0.1
1990	4	71.7	6.2	0.0
1991	4	24.5	8.1	0.0
1992	4	43.2	3.9	1.5
1993	4	63.5	6.7	1.1
1994	4	55.2	5.6	0.0
1995	5	58.9	6.3	0.9

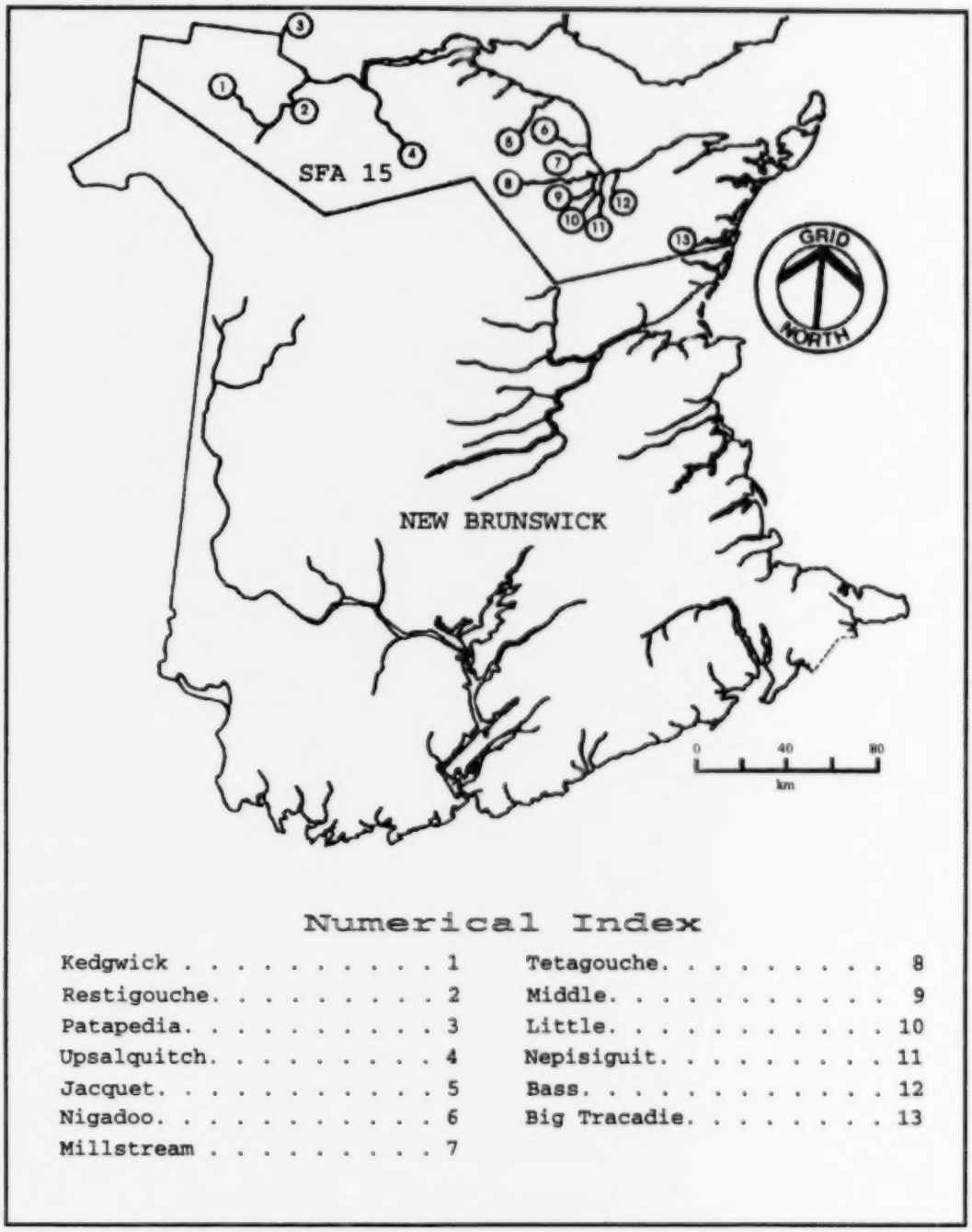

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Figure 1. Atlantic salmon rivers of SFA 15, discussed in this document.

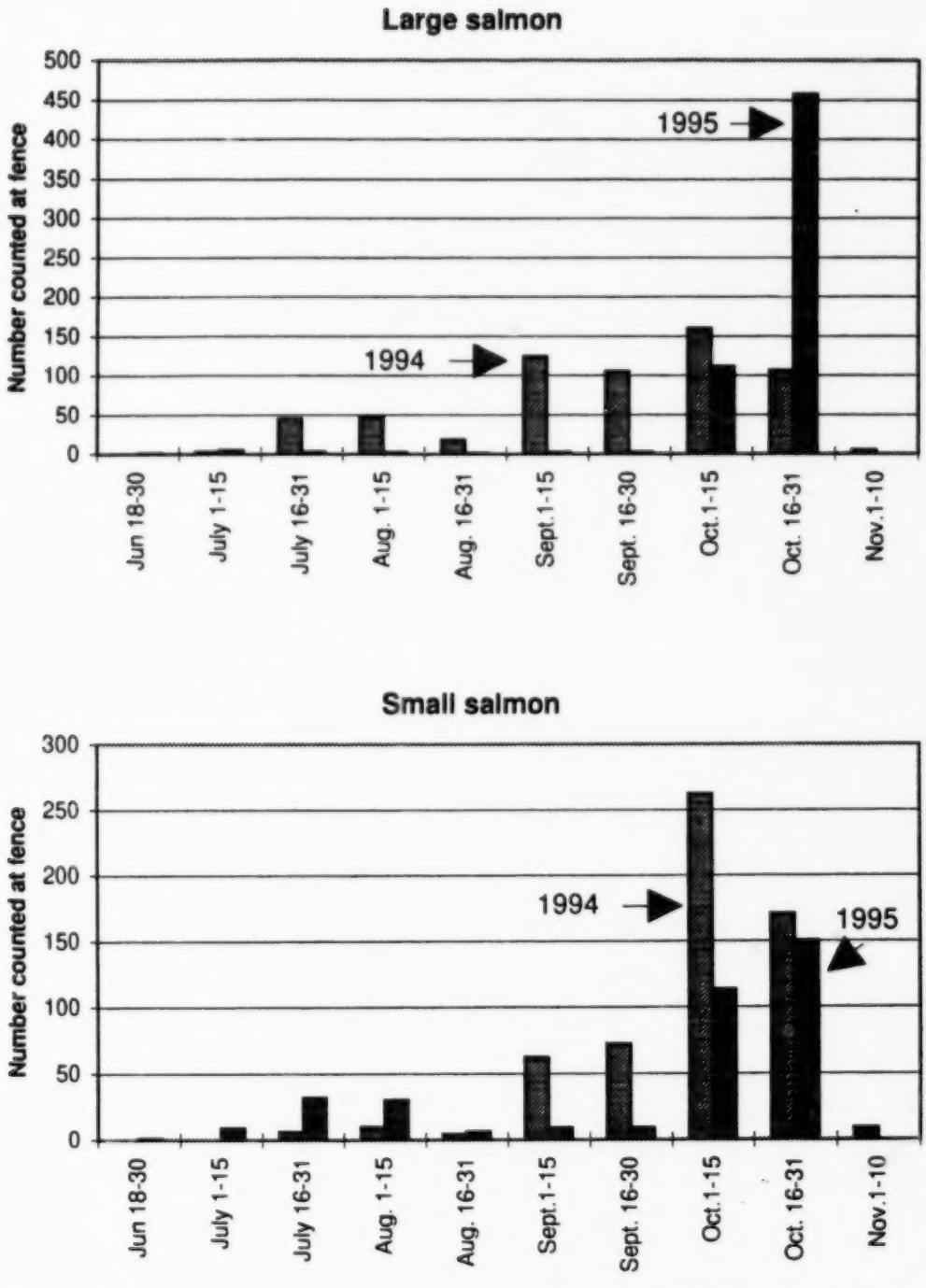

Fig. 2 Returns of Atlantic salmon to Jacquet River counting fence in 1994 and 1995.